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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/573,507
Filing Date: August 28, 2006
Appellant(s): LAVASTRE ET AL.

Tenley R. Krueger
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed September 2, 2008 appealing from the Office action mailed December 31, 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is substantially correct; however, claim 48 contents new matter, see the rejection of claim 48 under 35 U.S.C. 112, first paragraph in the following section (9).

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner. The rejections of claims 38-47 under 35 USC 112, first paragraph and claim 48 under 35 USC 103 over Collina et al.

(WO 96/11218) in view Chang (US 6,734,267), Smith et al. (US 4,587,227) and Lin et al. (New J. Chem. 2002, 26, 1485-1489).

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,734,267	Chang	11-2004
4,587,227	Smith et al.	5-1986
WO 96/11218	Collina et al.	4-1996

Lin et al., "*Polymer-incorporated iron catalysts for ethylene polymerization--a new approach to immobilize iron olefin catalysts on polystyrene chains*", New J. Chem. 2002, 26, 1485-1489.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

I. Claim 48 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicant has indicated that the support for independent claim 48 is described in Abstract and Figure 3. First of all, the Abstract only generally mentions a method for preparing bimodal polymers using hollow beads of polyethylene supported catalyst. Secondly, Figure 3 shows a scheme wherein a specific functionalized polystyrene (PS)

beads is impregnated with a specified complex; there is nothing showing that the impregnation is conducted under pressure and the polystyrene beads are porous as require by claim 48. On the contrary, the polystyrene beads in general are having smooth surfaces rather than being porous which is implied in the term "beads" and the catalyst can only be supported to the polystyrene surface via chemical bond due to the lack of pores on the surface of polystyrene beads. Because there is nothing on the record as originally filed to support the process of preparation of the "styrene supported catalyst" of claim 48, the claimed process is deemed to be new matter. Especially, styrene is a liquid compound at room temperature and it is not able function as a support.

II. Claims 38-47 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Collina et al. (WO 96/11218) in view Chang (US 6,734,267), Smith et al. (US 4,587,227) and Lin et al. (New J. Chem. 2002, 26, 1485-1489).

Collina generally teaches a multistage process for preparation of olefin polymers to produce a wide range of olefin polymer compositions working with different catalyst systems in the various stages (page 4, lines 12-14). Collina expressly disclose a multistage process comprising (A) a first stage of polymerization stage wherein one or more olefins are polymerized in the presence of titanium catalyst (Ziegler catalyst) to provide porous olefin polymer particles, (B) a treatment stage in which the catalyst used in the first stage of polymerization is deactivated and a second catalyst composition containing M-π is impregnated to the porous polymer particles, and (C) a second stage

of polymerization wherein one or more olefins are polymerized in the presence of the second catalyst impregnated on the porous olefin polymer particles from the first stage (page 4, line 12 to page 5, line 17). Since Collina's titanium catalyst is supported on $MgCl_2$ (page 7, lines 1-3) and Collina's polyolefin particles from the first stage polymerization are prepared from sphere shaped titanium catalyst (page 7, lines 23-29), one would have expected the olefin polymer particles from the first stage to maintain the sphere shape of the catalyst particles.

It is noted that Collina does not expressly teach the impregnation of the catalyst to the porous polymer particles under reduced pressure and the preparation of the porous ethylene polymer beads in the presence of a polystyrene supported iron based complex of formula (I) of claim 38.

Impregnating the catalyst solution to a porous support under vacuum or pressure maximizes the impregnation of the catalyst composition to the porous of the support and thus minimizes fouling during polymerization and significantly enhances reactor operability. Such is taught in Chang (col. 1, line 55 to col. 2, line 7).

Lin expressly teaches a polystyrene supported iron based complex core-shell structure catalyst for providing polyethylene porous beads with improved morphology (page 1485, Abstract; page 1486, Scheme 1; and page 1487, left col.).

It is routine practice to wash the supported catalyst to remove unsupported catalyst to minimize fouling during the polymerization and such is demonstrated in Smith (col. 8, lines 1-5).

The cited references are analogous because they all are from the same area of endeavor of olefin polymerizations.

Thus, it would have been obvious to a skilled artisan at the time the invention was made to employ Lin's polystyrene supported iron based complex core-shell structure catalyst in Collin's first stage polymerization of the multistage olefin polymerization process to provide a porous polyethylene beads with much improved morphology, and impregnating the polyethylene porous beads with a catalyst composition under reduced pressure and wash the supported catalyst to remove any unsupported catalyst complex in order to provide a support catalyst composition and further conducting an ethylene polymerization to provide a bimodal ethylene polymer with improved morphology and reduced fouling since such is conventionally done in the art and in the absence of any showing of criticality and unexpected results.

(10) Response to Argument

Appellant's argues that Collina does not teach, show or suggest supplying a polystyrene supported iron based catalyst to a first reaction zone to form porous polyethylene beads in the first stage polymerization, instead, Collina teaches a first stage polymerization utilizing a titanium or vanadium catalyst to provide porous polyethylene particles.

First of all, it is the examiner's position that claims 38-40 do not require the polyethylene beads to be prepared from an iron polymerization catalyst in the first stage polymerization. All that is required by claims 38-40 is that the catalyst utilized for preparation of the porous polyethylene beads is a supported catalyst. Since Collina's

catalyst in the first stage polymerization such as titanium catalyst is a supported catalyst as shown in the above rejection, Collina's catalyst for the first stage polymerization meets the limitation of claims 38-40.

Secondly, the iron based catalyst complex represented by formula (I) of claims 41-47 are taught in the secondary reference, Lin et al., wherein the iron based catalysts, SC-1 and SC-2, disclosed in Scheme 1 on page 1486 meet all of the limitations of the iron based catalyst of formula (I) of claims 41-47. In Lin's SC-1 and SC-2, the group corresponding to R of formula (I) is methyl, and the groups corresponding to R' and R" of formula (I) are both substituted phenyl group with isopropyl (^{i}Pr) on the 2 and 6 positions of phenyl respectively. Lin's teaching supplies the features missing from Collina of claims 41-47. Furthermore, Appellants' statements, "Lin teaches specific structures substituted with two pyridine substituents and one C_3 alkyl substituent (see, structures on page 16) rather than the substitution pattern of the pending claims", are unclear since there is only one pyridine structure and there are two isopropyl groups on the 2 and 6 positions in each of the two phenyl groups in Lin's SC-1 and SC-2. It is also noted that there is no "page 16" in Lin, and the examiner assumes that the referred "page 16" to be page 1486 instead. Since Collina's catalysts used in the multistage polymerization are not limited to a specific catalyst, one would have been motivated to use Lin's styrene supported iron based catalyst in Collina's first stage polymerization provide sphere shaped olefin polymer porous beads with improved morphology and to further conduct the second olefin polymerization in the presence of the catalyst

supported on the surface of the olefin polymer porous beads to provide the final bimodal olefin polymer composition .

In view the foregoing, the cited references together teach and suggest all of the limitation of the instant claims and thus the rejection under 35 U.S.C. 103(a) is deemed proper.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Caixia Lu/
Primary Examiner

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